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## NOTES ON THE NESTING OF THE FORSTER AND BLACK TERNS IN COLORADO

By ROBERT B. ROCKWELL.

WITH SEVEN PHOTOS

## FORSTER TERN

THE most beautiful and graceful bird with which our studies of bird life in the Barr Lake region brought us in contact, was the Forster Tern (*Sterna forsteri*). Their clear pearl-gray backs, snowy breasts, black crowns and brilliant orange feet and bills, coupled with the slender wings, deeply forked tail,



Fig. 23. FOUR "FLOATING" NESTS OF THE FORSTER TERN IN THE BARR LAKE REGION OF COLORADO

and graceful easy flight, all set off by a back-ground of deep-blue sky made a never-to-be-forgotten picture. Furthermore the striking contrast between their charming manners when unmolested and their screaming frenzy when excited, made them especially interesting examples of bird temperament. Their peculiar modes of nesting, and the many problems arising from their erratic habits lent further interest to our field work among them; and on the whole these charming birds furnished us with some of our most delightful days afield.\*

That these birds nested in Colorado was recognized as early as 1873 by Ridgway (Bull. Essex Institute V, Nov. 1873, 174) who stated that "a few breed in the state, but most of them are merely migrants," and Prof. W. W. Cooke in his "Birds of Colorado" (March 1897) classes them as "Summer Resident, rare." Both of these statements were no doubt true at the time they were written, which was before the day of extensive irrigation projects in Colorado. But through the

\* All of the notes on which this paper is based were taken in company with Mr. L. J. Hersey.

construction of numerous large storage reservoirs, with the consequent seepage and marsh land, suitable breeding grounds have increased in number many fold; and in the case of the Barr Lake region at least, these birds are now common summer residents and breeders, and so far as my own observations go I should say that a fair proportion of migrants make this the terminus of their northward migration.

The first appearance of the terns in the spring was about May first; our earliest record was April 27, 1907, on which date a total of fifteen birds was noted, at different points along the Barr chain of lakes. We did not note any extensive migration of these birds immediately following this date, and in fact we did not see any migrating flocks of terns which we did not have good reason to believe were a part of the local breeding colony. However, northward moving flocks might easily have passed through between our weekly visits to the lakes, or during the night.

By May 10, or a few days later, the full quota of breeding birds had apparently arrived, and nest building was begun within a few days. May 11, 1907, the nesting sites had apparently been selected, as the birds made a great commotion when we visited the spot, and the first egg was found May 17.



Fig. 24. THE INJURED FORSTER TERN AND NEST

The nesting site was a large musk-rat "house", standing in the dense cat-tail swamp surrounding a small rush-bound lake. The house which stood in about two feet of water, projected about two feet above the water, and the eggs were laid in a slight cavity among the dry cat-tail stalks composing the house. These nests corresponded exactly in location and construction with those we had examined the preceding year. On this date (June 9, 1906) we examined fifteen nests, all located on musk-rat houses, and containing eggs exhibiting all stages of incubation. The fifteen nests contained one set of six, two sets of five, nine sets of three, and one nest a single egg.

On May 24, 1907, (a week after the first eggs were found) the breeding colony was in full swing, and we were surprised to find a number of nests, containing complete sets, which had been built by the birds upon floating masses of decaying cat-tails.

These structures were all made entirely of dead cat-tail stalks, and while they varied greatly in size and bulk, the general plan of construction was the same in all, being a compact pile of material of irregular outline, apparently floating on the

surface of the water (although in reality the nests were supported by masses of dead cat-tails beneath the surface of the water) and were very conspicuous owing to the lack of concealing vegetation. The eggs were deposited in the center of the pile in a neat depression, which was lined with small bits of the same material. The bottom of the cavity was, in every instance, well above the surface of the water (usually from two to six inches) and the nest cavities were entirely free from moisture. Most of these nests were built in comparatively open water almost waist deep, and about thirty yards from shore.

On the date mentioned (May 24) fifteen nests were examined, about a third of which were constructed by the birds as described, while the remaining two-thirds were the usual depressions, in musk-rat houses. The majority of these nests contained three eggs, but a few of them held only one and two, and one nest contained five



Fig. 25. CLOSE VIEW OF FORSTER TERN'S NEST SHOWING DETAIL OF NEST CONSTRUCTION; NOTE THE TWO COLOR TYPES OF EGGS, THE TWO IN THE FOREGROUND BEING OF THE DARK BROWN TYPE AND THE THREE IN BACKGROUND OF LIGHTER GROUND-COLOR

This "set" together with all the other sets of five and six examined by us contained eggs of two very distinct types of coloration, one type having a decidedly greenish ground color with small spots and blotches of brown; the other type having a clear brownish or reddish brown ground color, with much larger spots and blotches of very dark brown; and it is altogether probable that the two color types were laid by different birds though in the same nest. In fact after careful observation we came to the conclusion that three eggs composed the maximum set (with rare exceptions) and that nests containing five and six eggs were the depositories of more than one bird. We are at a loss to account for this peculiar feature, as we did not see more than one bird around any one of the nests, and unoccupied nesting sites were abundant upon every hand.

On May 31 the colony contained many more nests than on the preceding week, and the birds were much tamer, several alighting on their nests within twenty yards of us. On June 8 all the nests contained incubated eggs, and on June 15 (1908) and June 9 (1909) we found two nests containing freshly hatched young. June 22 about half of the eggs had hatched, and on the 30th the water in the lake rose sufficiently to flood part of the nests, and many of the unhatched eggs were destroyed.

The young are beautiful little creatures, with a coat of silky down in soft grays and browns. While very young they somewhat resemble chicks, except for their long, sharp bills. They take to the water very readily and their knack of self-concealment is wonderful. With nests on every side of us and a hundred screaming parents circling above our heads, an hour's hard search rewarded us with only four young, although there must have been at least a hundred young ones hiding in the area covered by our search. The young as soon as they can "navigate" are very animated, and show an unusual fear of an intruder. They are also quite pugnacious, babies no larger than a warbler, pecking at an outstretched finger as viciously as a young hawk.



Fig. 26. NEWLY HATCHED YOUNG FORSTER TERNS

On July 6 many of the remaining nests still contained eggs, and one belated set was found July 21, on which date a great many young of the year were on the wing, and the breeding season of 1907 was practically at an end.

The tendency to colonize was apparent wherever we found terns nesting. The fifteen nests found in 1906 were located on musk-rat houses covering a tract of possibly twenty acres, and outside of this area we did not find a single nest. Several of the rat houses supported two nests, and one had three nests containing complete sets. The site of the colony in 1907 was about 300 yards from that of 1906 and covered a somewhat larger space, but the great bulk of the nests (probably seventy-five in all) were in an area of less than ten acres. Four of the floating nests mentioned above were close enough together to permit being photographed at one exposure. (See Fig. 23.)

The birds were at all times extremely demonstrative, rising in a cloud and coming to meet us with loud cries, while we were still a hundred yards or more distant from the nests. The din of their voices would increase as we approached the nests, and (after the young were hatched) when the nests were reached the birds would swoop down on us from quite a height on noiseless wings, and as they

swerved to barely miss our heads would give utterance to a shrill scream, which, coupled with a sudden booming of the wings, was altogether disconcerting. We often had the birds swoop so close to us that we could plainly feel the rush of air from their wings.

A few Black-crowned Night Herons were nesting among the terns, and one unfortunate youngster, unable to fly, who deserted his nest at our approach, took refuge on a tern's nest, where he was promptly attacked by half a dozen of the birds, and although twice as large as his assailants, was knocked down repeatedly, by well directed blows of the birds' wings, until he finally sought safety in the water.

We frequently saw the birds flying about with small fish in their bills, and on one occasion a minnow about two inches long was found in a nest containing young.

We found one unfortunate bird suspended by the neck, between two upright cat-tail stalks, just above the crotch, on which in its frantic efforts to liberate itself it had sawed its neck painfully. Our timely arrival probably saved it from a tragic death, as it was almost exhausted when we liberated it.

#### BLACK TERN

Also beautiful, and even more interesting to us than the Forster Terns because of the mysterious manner in which their breeding grounds eluded our search were the Black Terns (*Hydrochelidon n. surinamensis*). These dainty little fellows were fully as abundant in point of numbers as the Forster Terns, but although we saw numbers of



Fig. 27. YOUNG FORSTER TERN ABOUT ONE-THIRD GROWN

birds on every trip, careful and thorough searching failed to discover a nest during the breeding season of 1906, and that of 1907 was almost gone, before the coveted prize was discovered.

The birds appeared early in May (May 11, 1907, is my earliest record) and a week later were common. On May 17, 1907, one flock of sixty-five birds was seen (apparently migrants), and on May 17, 1908, two flocks of fully one hundred birds each were observed at the lakes. Soon after arriving the birds would become wonted to some certain pond or lake, and here amid their threatening screams and complaints we would splash through waist deep water by the hour, and plow through acres of soft black ooze, and decaying cat-tails, in a fruitless search for the nests.

Finally on July 5, 1907, after nearly all the rest of the birds had finished their nesting, and after we had about given up hope of finding the Black Terns' nests at all, the happy discovery was made, and I can do no better than to quote from my note-book of that date.

"There were only four Black Terns on the lake, as near as we could tell, and we worked the whole lake over, and then found the nest by coming back to the

first place where the terns had made a demonstration. All the time we were within seventy-five or eighty yards of the nest the birds circled about over us, sometimes poising almost motionless with rapidly beating wings, and continually uttering the characteristic shrill Black Tern cry. We did not see the birds alight a single time, so when we saw one fly up from among the rushes, not more than thirty feet from us, we went to the spot, and there was the nest. It was built on a dense carpet of dead cat-tails, blown over by the wind, forming a smooth, level and perfectly dry mat, upon which the nest and eggs, though small, showed conspicuously, even from a distance of fifteen or twenty feet. The nest proper was very similar to the nests of the Forster Tern though smaller; made entirely of short pieces of dead

cat-tail blades, rather slightly cupped but compactly built. It was located about ten feet from the low boggy shore, in a sparsely covered spot amongst dense cat-tail growth and over not more than six inches of water."

On May 30, 1908, we were more fortunate, finding two nests within a short distance of each other after a very brief search. The first nest was of the usual construction, and was built on a large circular wooden top of a duck blind, which was floating just at the edge of the cat-tails, in a small rush-bound pond. It contained two eggs and was rendered very conspicuous by its peculiar location. The water at this spot was almost waist deep. Not far away the second nest was found "built on a mass of dead floating cat-tails" and made entirely of dead brown cat-tail blades, fairly well cupped and containing three eggs. In both cases the birds were very noisy and demonstrative, and we quickly located their nests by their actions.



Fig. 28. NESTING SITE OF BLACK TERN; EGGS MAY BE SEEN IN LOWER CENTER OF PICTURE

Other work prevented us from observing these nests during the period of incubation and from studying the young, but the appearance and habits of the young birds would in all probability vary but little from those of the young Forster Terns with which we were somewhat familiar.

The most baffling question with which we were confronted was whether or not only a very small part of the summer residents nested. It hardly seems possible that only a few birds of the hundreds seen by us on nearly every trip were breeding, yet on the other hand, it is hard to believe that our careful search over all the most suitable ground, would fail to discover the nests if they were nesting in large numbers.

Our study of the terns was simply one of many illustrations of the wonderful changes of bird distribution brought about by the magic touch of water on what was once a dry, arid prairie.



Fig. 29. CLOSER VIEW OF BLACK TERN'S NEST SHOWING DETAILS OF CONSTRUCTION

## SUMMER BIRDS OF WILLOW CREEK VALLEY, MALHEUR COUNTY, OREGON

By MORTON E. PECK

DURING the past summer (1910), the writer spent several weeks, that is, from June 22 to July 25, at Brogan, Malheur County, Oregon. Brogan is as yet a town-site rather than a town, but it promises a considerable growth, as the result of the execution of an extensive irrigating project. It lies in the valley of Willow Creek, twenty-five miles northwest of the town of Vale, about fourteen miles from the Idaho line, one hundred and fifty from the southern boundary of the state, and a little less from the northern.

The study of birds not being the primary object of the visit, only a small amount of territory was covered, though this was looked over with considerable care. Some five miles of the valley of Willow Creek were gone over repeatedly, a trip of about eighteen miles was made up the canyon of the creek, two or three smaller tributary canyons were explored for several miles and visited on two or more occasions, and the sage-brush-covered hills were gone over for four or five miles in various directions from Brogan.

Willow Creek Valley proper begins about two miles above Brogan, where the